Global Elimination of Hepatitis B: Is it Possible?

Su Wang, MD MPH
Medical Director, Center for Asian Health
Saint Barnabas Medical Center
Executive Board Member, World Hepatitis Alliance
su.wang@rwjbh.org
@swang8

NJ Immunization Conference
November 30, 2016

Disclosures

• No financial disclosures or conflict of interest
Outline

• A Global Perspective of Hepatitis B
• Hepatitis B in New Jersey
• Stopping Mother-Child Transmission
• Is the End in Sight?

Top 10 causes of death worldwide

1. Ischaemic heart disease
2. Cerebrovascular disease
3. Chronic obstructive pulmonary disease
4. Lower respiratory infections
5. Alzheimer’s disease
6. Lung cancer
7. Viral hepatitis
8. Road injuries
9. HIV/AIDS
10. Diabetes
Chronic Hepatitis B Virus

• **350-400 Million with chronic hepatitis B globally**\(^1\)
  – 10 x more prevalent than HIV (35M)

• **Hepatitis B is leading cause of primary liver cancer worldwide**\(^2\)
  – 4-5,000 deaths a year

• **HBV is a major health disparity in US**
  – More than ½ of infected in the US are Asians
  – Other foreign born:
    22% Latin America, 13% Africa, 7.5% Europe

---

Hepatitis B is a silent killer

- The majority with chronic hepatitis B (CHB) infection are asymptomatic.
  - Even liver enzymes may be normal.
- As many as 2 out of 3 with CHB may not even know they are infected
  - Physicians are underscreening
- Once symptomatic (jaundice, abdominal pain or distention), may be cirrhotic or have liver cancer
  - 1 out of 4 with CHB may develop these complications
  - Early treatment and intervention can prevent

---

Natural History of HBV Infection

- CHB
  - 5%-10%¹
  - 30%²
- Cirrhosis
  - 23% in 5 years³,⁴
  - 10%-15% in 5 years²
- Liver Flare
- Liver Failure
- HCC
- Liver Transplantation
- Death

CDC: HCC is the Fastest-Growing Cause of Cancer-Related Death in the USA

Age-Adjusted Incidence and 5-Year Survival Rates for Patients with Hepatocellular Carcinoma in the United States, 1973–2007

- Incidence of hepatocellular carcinoma (HCC) in the U.S. has tripled during the past two decades while the 5-year survival rate has remained below 12%\(^1\)
- The rise of HCC is largely related to unscreened and untreated chronic viral hepatitis (Hepatitis B and C)

2. Adapted from CDC fact sheet, Hepatitis C: Expansion of Testing Recommendations, Aug 2012

Why don’t we hear much about Hep B?

HBV is endemic in most of the world!

Hepatitis B Prevalence >2%
Estimated HBV Prevalence among Foreign-born Americans

<table>
<thead>
<tr>
<th>Place of Birth</th>
<th>2008 Population (FB from all regions)</th>
<th>CHB Prevalence Rate CHB Prevalence in the U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FB from all regions</td>
<td>41,329,349</td>
<td>2.0% 3.7% 5.4% 847,145 1,522,798 2,243,757</td>
</tr>
<tr>
<td>Asia</td>
<td>10,970,572</td>
<td>0.1% 0.3% 0.4% 847,145 2,243,757</td>
</tr>
<tr>
<td>Central America</td>
<td>16,068,537</td>
<td>0.4% 1.3% 2.5% 71,902 208,804 398,598</td>
</tr>
<tr>
<td>Caribbean</td>
<td>3,588,352</td>
<td>1.1% 2.3% 3.9% 38,902 82,000 140,074</td>
</tr>
<tr>
<td>South America</td>
<td>2,856,583</td>
<td>1.0% 1.6% 2.4% 28,258 46,614 69,783</td>
</tr>
<tr>
<td>Africa</td>
<td>1,669,101</td>
<td>7.8% 11.8% 16.8% 130,722 196,338 280,196</td>
</tr>
<tr>
<td>Europe</td>
<td>5,113,072</td>
<td>0.9% 2.2% 3.4% 48,073 114,174 174,361</td>
</tr>
<tr>
<td>Oceania</td>
<td>174,814</td>
<td>4.1% 5.4% 7.7% 7,156 9,424 13,490</td>
</tr>
<tr>
<td>North America</td>
<td>888,318</td>
<td>0.1% 0.3% 0.4% 888 2,665 3,553</td>
</tr>
</tbody>
</table>

Welch ISVHL, 2009 (Abstract 216)
Hepatitis is Underfunded

<table>
<thead>
<tr>
<th>Virus</th>
<th>US population</th>
<th>% of CDC Division Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>HBV</td>
<td>0.8-2.2 million</td>
<td>2% (for both HBV/HCV domestic/international)</td>
</tr>
<tr>
<td>HCV</td>
<td>2.7-3.9 million</td>
<td></td>
</tr>
<tr>
<td>HIV</td>
<td>1.1 million</td>
<td>69% (domestic, not including international HIV work)</td>
</tr>
</tbody>
</table>

- Those affected are the silent minorities, no political voice
- Health Disparity/Equity Issue
  - We have the tools-vaccine, medications for cure/treatment, medical knowledge
  - Those most at-risk are falling through the system

Global Movement of Hepatitis Elimination

- WHO Global Health Sector Strategy 2016
  - Adopted by the 196 countries May 2016
  - Goal = Eliminate public health problem of hepatitis B & hepatitis C by 2030
- #NOhep campaign launched July 28, 2016 on World Hepatitis Day

Elimination of Viral Hepatitis...
Mankind’s Next Greatest Achievement
May 2016: WHO Adopted the Goal to Eliminate HBV by 2030

https://www.youtube.com/watch?v=cVttfLgExL0

Viral Hepatitis Elimination in the US:
The National Academy of Science 2016 Report

**Phase 1: April 2016**
Committee Chair, Dr. Brian Strom, Chancellor of Rutgers Medical School

“We have the tools to eliminate, but will require significant resource allocation, commitment and strategy”
Hepatitis B Vaccine

- 1st vaccine (plasma based) available 1981
- Recombinant available 1986
- Prevents HBV infection by stimulating production of antibodies against HBV
- 3 shot series $\rightarrow$ 95% efficacy rate
- Universal vaccination of all infants/children
  - Started in 1991 in US

**Hepatitis B by Year, United States, 1966 - 2000**

Source: NNDSS
Large Gaps in HBV Screening and Care

Persons unaware of their infection

New USPSTF Screening Recommendations issued May 2014
**USPSTF upgrades HBV screening (Grade B)**

- Screen high-risk populations, including those
  - Born in HBV prevalent regions (Asia, Africa, Middle East, Eastern Europe, etc)
  - US-born w/ parents born in above countries
  - Diabetics
  - HIV, IVDA, MSM
  - Living with or sexual partners of HBV+ (household contacts)
  - Immunosuppressed individuals (chemo)
  - On hemodialysis

HBV screening must be covered by insurance plans under ACA rules
(As a preventative service with no cost sharing to patient)

**What are the HBV Screening tests?**

- **Hepatitis B surface antigen (HBsAg)**
  - If positive, indicates HBV infection

- **Hepatitis B surface antibody (anti-HBs)**
  - If positive, indicates HBV immunity (could be from vaccination or prior infection)

- **Hepatitis B core antibody (anti-HBc)- total or IGG**
  - If positive, patient has or had HBV infection (exposed)
  - If screening asymptomatic pt, no need to order IgM
Impact of national screening strategies: HIV vs HBV

1,000,000 in US with HIV

Routine Screening as of 2006

- 250,000 Aware & Not in Care
- 250,000 Unaware & Not in Care
- 500,000 Aware of Infection & In Care

1,250,000 in US with Chronic HBV

Risk-Based Screening

- 225,000 Aware & Not in Care
- 990,000 Unaware & Not in Care

- 35,000 Aware of Infection & In Care

HIV – CDC and Kaiser Family Foundation; HBV – CDC estimates and Cohen

HBV in New Jersey

- Little is known
  - Almost no studies reporting HBV screening efforts in NJ
  - Prevalence unknown
- More than 70% of NJ family physicians were not routinely performing liver cancer screens in CHB patients
- Half were not testing household contacts of CHB patients for infection

Foreign-Born Residents in NJ

- ~22% of NJ residents are foreign-born (FB)
  - Incr by ~30% over past 10 years
- 3rd largest population of FB in the US
  - Following CA (27%) & NY (22%)

https://www.census.gov/programs-surveys/acs/

Why a Center for Asian Health in NJ?

- NJ has 4th largest Asian population in US (Behind NY, CA, TX, and surpassing HI)
- Rapid recent/projected growth of Asians in NJ

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>74.5%</td>
<td>70.7%</td>
<td>67.3%</td>
</tr>
<tr>
<td>Black</td>
<td>14.6%</td>
<td>14.5%</td>
<td>14.0%</td>
</tr>
<tr>
<td>Asian</td>
<td>8.5%</td>
<td>11.1%</td>
<td>13.3%</td>
</tr>
</tbody>
</table>

Asians make up 5.8% of US vs 8.5% of NJ (2010 Census)

- Lack of cultural/language services in NJ (vs NYC)
  - Leads to health disparities, including healthcare access
- Certain diseases affect Asians more
  - Diabetes, Hepatitis B, Head/neck cancer
  - Stomach/Liver cancer, Lupus, Osteoporosis
Asians in NJ

Asians are not being Screened for HBV

• Even among Asian-American PCPs with a large % of Asian patients, only 50% routinely screen their Asian patients for HBV

• Stated reasons for not ordering a screening test in Asian patients included:
  – Patient not considered to be at risk for HBV (23%)
  – No symptoms (16%)
  – Patient has received vaccination series (15%)
  – Lack of insurance (13%)

Chu, et al "Hepatitis B Screening and Vaccination Practices in Asian American Primary Care" 2013
CDC awards Hepatitis B grant to NJ/NYC in Sept 2014

Grant Partnerships
# Overview of Program

<table>
<thead>
<tr>
<th>HBV Screening</th>
<th>Healthy Liver Program</th>
<th>Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Primary Care Screening</td>
<td>• Screen 1,000 people yearly x 3 years (NJ + NY)</td>
<td>• Increase identification of HBV+ individuals</td>
</tr>
<tr>
<td>2. Community Screening</td>
<td>• Identify 125 hep B positive pts</td>
<td>• Link HBV+ to care for evaluation, monitoring and treatment</td>
</tr>
<tr>
<td>3. Screening Coupon (Outpatient labs and In-clinic)</td>
<td>• Link 100 pts to care</td>
<td>• Prevention &amp; early detection of cirrhosis and HCC</td>
</tr>
<tr>
<td>4. DOH Referral</td>
<td>• 80 pts attend 1st medical visit</td>
<td>• Decrease overall HBV morbidity and mortality in NNJ &amp; NYC</td>
</tr>
</tbody>
</table>

PCP & Collaborative Care Model, Provider Training, Media Campaign, & Patient Education

---

# Novel Screening Coupon: Eliminate Barriers

**If you or your parents are from ONE OF THESE COUNTRIES...**

**You are at risk for Hepatitis B!**

**Hepatitis B is the world’s leading cause of liver cancer**

**Do you know your status?**

2 out of 3 with Hepatitis B are not aware.

LiverBWell.com
Patient-initiated Screening at Outpatient Labs

**Get Your Free Test — Visit One of Our Hepatitis B Screening Sites Today!**

This is a lab requisition form (please fill out your name)

<table>
<thead>
<tr>
<th>Screening Sources</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Care-Based</td>
<td>296</td>
<td>33%</td>
</tr>
<tr>
<td>Community Events</td>
<td>522</td>
<td>59%</td>
</tr>
<tr>
<td>Coupon Screening</td>
<td>69</td>
<td>8%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>887</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

**NJ Hepatitis B Screening Data**

10/14-7/16

**Participants Birthplace**

- China: 256 (31.2%)
- US: 182 (22.2%)
- Taiwan: 172 (21.0%)
- Hong Kong: 42 (5.1%)
- Other Asia: 39 (4.8%)
- Caribbean: 32 (3.9%)
- Im America: 26 (3.2%)
- Africa: 25 (3.0%)
- South Asia: 18 (2.1%)
- Other: 14 (1.7%)
- Europe: 7 (0.9%)
- Middle East: 4 (0.5%)
Serology Results

<table>
<thead>
<tr>
<th>HBV status</th>
<th>Freq.</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infected (HBsAg +)</td>
<td>42</td>
<td>4.8%</td>
</tr>
<tr>
<td>Susceptible (HBsAb -)</td>
<td>303</td>
<td>34.8%</td>
</tr>
<tr>
<td>Immune (HBsAb +)</td>
<td>492</td>
<td>56.6%</td>
</tr>
<tr>
<td>Isolated (HbcAb + only)</td>
<td>33</td>
<td>3.8%</td>
</tr>
<tr>
<td>Total</td>
<td>870</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

HBV Infection, by Birthplace

<table>
<thead>
<tr>
<th>Birthplace</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>11% *</td>
</tr>
<tr>
<td>Taiwan</td>
<td>8% *</td>
</tr>
<tr>
<td>Other Asia</td>
<td>5% *</td>
</tr>
<tr>
<td>US</td>
<td>1%</td>
</tr>
</tbody>
</table>

* p<0.01 compared to US.
Other birthplaces with HBV+: Ghana, Ecuador, Peru, US

Insurance, PCP and Previous HBV Screening Status

Status of insurance

- Insurance, 63%
- No insurance, 14%
- No PCP, 14%
- Don’t know, 8%
- Other, 15%

PCP for insured

- PCP, 69%
- No answer, 17%
- No PCP, 14%
- Don’t know, 36%
- Yes, 30%
- No, 34%

HBV screening by PCP

- Yes, 30%
- No, 34%
HBV Knowledge

HBV Transmission

- Eating Unclean Food: 54% Correct, 46% Incorrect
- Sharing Food: 47% Correct, 53% Incorrect
- Seafood: 48% Correct, 52% Incorrect
- Unprotected Sex: 57% Correct, 43% Incorrect
- Contaminated Needles: 59% Correct, 41% Incorrect

Disease Knowledge

- No Symptom: 53% Correct, 49% Incorrect
- Affects the Liver: 76% Correct, 24% Incorrect
- Affects the Heart: 49% Correct, 51% Incorrect
- Cause Cancer: 52% Correct, 48% Incorrect
- Remains in the Body: 62% Correct, 38% Incorrect
- Goes Away on Its Own: 69% Correct, 31% Incorrect

Prevention & Treatment

- Controllable with Exercise: 43% Correct, 57% Incorrect
- Treatable with Meds: 64% Correct, 36% Incorrect
- Curable with Meds: 36% Correct, 64% Incorrect
- Preventable by Vax: 69% Correct, 31% Incorrect

Hep B Immunity: US-Born vs Foreign Born

**Age Distribution**

- 25-44: 59% Foreign born, 70% US born
- 45-64: 57% Foreign born, 38% US born
- >=65: 59% Foreign born, 22% US born

**From Prior Infection**

- 25-44: 21% Foreign born, 4% US born
- 45-64: 34% Foreign born, 7% US born
- >=65: 42% Foreign born, 11% US born

**From Vaccination**

- 25-44: 39% Foreign born, 66% US born
- 45-64: 23% Foreign born, 31% US born
- >=65: 17% Foreign born, 11% US born

*In Fig. 5B and 5C, p < 0.01 in each age group between US born and foreign born groups.*
Eliminating Perinatal HBV Transmission
Why Eliminate Perinatal HBV
Crucial to HBV Elimination

- Mother-to-baby transmission of HBV accounts for 35-50% of chronic hepatitis B infection
- Infected babies more likely to develop chronic infection
  - 90% of HBV infected infants
  - 30% of infected children aged <5 years
  - <5% of infected persons aged ≥5 years (usually resolve)

- Infected babies → lifelong infection → reservoir of infection/transmission → cirrhosis/liver cancer

Vaccine Prevention of Hepatitis B

Key Components in the US

- HBV/HBIG within 12 hours for infants of HBsAg+ mothers (1984)
- 3 shot HBV series added to infant vaccine schedule (1991)
- HBV birth dose recommended for all infants (1999 )
  - Recommended by ACIP, CDC, AAP, NQF, ACOG

Wong VC, Ip HM, Reesink HW et al. (1984) Prevention of the HBsAg carrier state on newborn infants of mothers who are chronic carriers of HBsAg and HBeAg by administration of hepatitis B vaccine and hepatitis B immunoglobulin. Double-blind randomized placebo-controlled study. Lancet 1(8383):921-926.
Vaccine Effectiveness in Preventing Perinatal Transmission

For Infants of HBV+ mothers
Passive-active immunoprophylaxis with HBIG/HBV vaccine
– Up to 70-90% transmission rate in HBeAg+ without vax
– Vaccination reduces transmission to 3-7%

Incidence of chronic HBV infections under different scenarios (2015-2080)
HBV is a vaccine success story, but there are gaps

**Low Coverage of Universal Birth Dose**

In 2010 Institute of Medicine

“The goal of eliminating perinatal HBV transmission has not been achieved largely because of incomplete coverage of newborns with a birth dose of hepatitis B vaccine”

**HBV Birth Dose in the Americas**

- US: 69%*  
- Mexico 89%  
- Brazil 88%  
- Cuba 99%

Countries lower than the US: Honduras, Suriname

*Compared to 96.6% receive vit K at birth

---

**New Jersey Birth Dose Coverage**

Data Source: National Immunization Survey, CDC
HBV is a vaccine success story, but there are gaps:

1000 infants/year in US acquire HBV perinatally

• Failure of healthcare system
  - Mother not screened during pregnancy
  - Mother not identified as HBV+ at delivery
    - No Labs available, Error in transcription
  - Infants don’t receive proper vaccination
  - Infant don’t get post-vaccination serology test

• Biologic Failures
  - Maternal High HBV DNA, eAg+
  - Use of antivirals during 3rd trimester shown to reduce

Why should we give hepatitis B vaccine to all newborns?

• >24,000 infants/yr are born to HBV+ mothers and not all of their infants receive post-exposure prophylaxis

• Prevents mother-to-infant transmission: Prevents 70-95% of infection among infants of HBsAg+ women

• Prevents household transmission: Protects infants from infected family members and caregivers (babysitters, grandparents, au pairs, visitors from other countries)

• Protects when medical errors occur: Provides a safety net to prevent perinatal HBV infection when medical errors occur

Smith EA. Pediatrics 1012;129:609-616; MMWR 2005;57(RR-8):1-20

☐ 192 hospitals examined; Reviewed 4762 mothers
☐ 18 infants born to HBV+ mothers
  ☐ Only 62% had both HBIG/HBV within 12 hours of birth
    ■ 14% did not receive HBV vaccine
    ■ 20% did not receive HBIG
☐ 320 infants born to mothers with unknown HBV status
  ☐ 52% vaccinated within 12 hours, 20% vaccinated before discharge

Strongest predictor of birth dose vaccine was having a hospital protocol!
Increased Risk of Biologic Failures: High HBV DNA Level, HBeAg +

Rate (%)

All Infants of HBV DNA-Positive Mothers  HBeAg-Positive Mothers

0%  0%  0%

Maternal HBV DNA (copies/mL)

No cases of transmission from mothers with HBV DNA <8 log_{10} copies/mL.
One case of escape mutation identified.


Charles B. Wang Community Health Center
Hepatitis B Moms Program

- FQHC serving largely Chinese population in Metro-NYC
  - High prevalence of HBV, 12% of all patients
  - Registry of 7000 HBV+ patients
  - >100 infected children
- ~720 pregnancies a year
  - ~15% with maternal HBsAg+

From 2007-2010, 5 infants at CBWCHC acquired HBV via Vertical Transmission
  - Cases of VT were examined to identify gaps in care
  - Hep B Moms program was formed from the lessons learned
Cases of HBV Infected Infants at CBWCHC (2007-10)

All mothers with lab data were HBeAg+. No infants were breastfed (though not a risk factor and recommended by AAP and WHO for HBV+ mothers). All infants completed HBV vaccine series.

<table>
<thead>
<tr>
<th>Last recorded viral load before delivery (copies/mL)</th>
<th>Discussed antiviral tx</th>
<th>Anti-viral Tx</th>
<th>Date &amp; Type of delivery</th>
<th>HBIG</th>
<th>Sent to China?</th>
<th>Initial HBsAg+ Test (infant)</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>118,000,000</td>
<td>N</td>
<td>N</td>
<td>3/08 CS</td>
<td>Y</td>
<td>Y</td>
<td>35 mo</td>
<td>No antiviral tx and VL &gt; 10^8 copies/mL, infant went to China at 6 mos, late serology</td>
</tr>
<tr>
<td>1,422,000,000</td>
<td>Y</td>
<td>N</td>
<td>3/09 NSVD</td>
<td>N</td>
<td>N</td>
<td>8 mo</td>
<td>No HBIG given by hosp, no antiviral tx and VL &gt; 10^8 copies/mL</td>
</tr>
<tr>
<td>911,000,000</td>
<td>Y</td>
<td>LAM for 6 wks</td>
<td>4/09 NSVD</td>
<td>Y</td>
<td>N</td>
<td>10 mo</td>
<td>Antiviral Rx prescribed, but VL still &gt; 10^8 c/ml and HBV transmission in sibling</td>
</tr>
<tr>
<td>UN</td>
<td>UN</td>
<td>UN</td>
<td>10/09 NSVD</td>
<td>Y</td>
<td>N</td>
<td>9 mo</td>
<td>Mother was not CBWCHC pt.</td>
</tr>
<tr>
<td>UN</td>
<td>N</td>
<td>N</td>
<td>12/10 CS</td>
<td>Y</td>
<td>Y</td>
<td>9 mo</td>
<td>Mother was not CBWCHC pt., but was on antiviral before pregnancy and discontinued during pregnancy</td>
</tr>
</tbody>
</table>

Hep B Moms Roadmap
Gap in Care:
Post-Vaccine Serology Test Not Ordered @9-12 months
Pediatrician may be unaware (or forget) that infant’s mother is HBV+

- Postvaccination serologic testing is HBsAb/HBsAg
- Occurred in 63% of case-managed infants from the 2012 birth cohort (U.S. Perinatal Hepatitis B Prevention Program)
- Without post-vaccination serologic testing:
  - Infected infants are not identified
  - Infants who are not immune are not identified for revaccination
    - Remain susceptible to infection from household and other exposures

Hep B Moms Program:
Post-Vaccine Serology Test Reminder

Hep B Sticker for Newborn Immunization Card

Affixed at Hospital Nursery (NYDH) for babies of HBV+ moms
- Documents HBIG administration (no designated space on vax card)
- Reminds when HBV serology should be done
- Spells out tests to order with space to fill in results

We would like to acknowledge Stanford’s Asian Liver Center for the idea to develop the sticker.
Characteristics of HBV+ Mothers

<table>
<thead>
<tr>
<th></th>
<th>2007-10 (N=465)</th>
<th>2011-12 (N=181)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (yrs) of mother (SD)</td>
<td>24.13 (±4.3)</td>
<td>28.9 (±4.7)</td>
<td></td>
</tr>
<tr>
<td>HBeAg+</td>
<td>122 (26.2%)</td>
<td>44 (24.3%)</td>
<td>0.001*</td>
</tr>
<tr>
<td>HBV DNA</td>
<td>N=233</td>
<td>N=141</td>
<td></td>
</tr>
<tr>
<td>&gt; 10^6 copies/ml</td>
<td>34 (14.6%)</td>
<td>31 (22.0%)</td>
<td>0.146</td>
</tr>
<tr>
<td>10^5-10^6 copies/ml</td>
<td>27 (11.6%)</td>
<td>8 (5.7%)</td>
<td></td>
</tr>
<tr>
<td>10^4-10^5 copies/ml</td>
<td>17 (7.3%)</td>
<td>30 (21.3%)</td>
<td></td>
</tr>
<tr>
<td>&lt; 10^4 copies/ml</td>
<td>155 (66.5%)</td>
<td>72 (51.1%)</td>
<td></td>
</tr>
<tr>
<td>Mean ALT</td>
<td>29</td>
<td>25</td>
<td>0.047*</td>
</tr>
<tr>
<td>Received antiviral medication in 3rd trimester</td>
<td>37 (8%)</td>
<td>27 (14.9%)</td>
<td>0.008*</td>
</tr>
<tr>
<td>Continued antiviral initiated before pregnancy</td>
<td>2 (0.4%)</td>
<td>3 (1.7%)</td>
<td></td>
</tr>
</tbody>
</table>

Antiviral Medication by Year

<table>
<thead>
<tr>
<th>Year</th>
<th>No of Patients</th>
<th>Lamivudine</th>
<th>Telbivudine</th>
<th>Tenofovir</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>4</td>
<td>80%</td>
<td>30%</td>
<td>20%</td>
</tr>
<tr>
<td>2008</td>
<td>3</td>
<td>30%</td>
<td>90%</td>
<td>80%</td>
</tr>
<tr>
<td>2009</td>
<td>3</td>
<td>10%</td>
<td>14%</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>1</td>
<td>40%</td>
<td>30%</td>
<td>86%</td>
</tr>
<tr>
<td>2011</td>
<td>2</td>
<td>60%</td>
<td>70%</td>
<td>14%</td>
</tr>
<tr>
<td>2012</td>
<td>1</td>
<td>90%</td>
<td>90%</td>
<td>60%</td>
</tr>
</tbody>
</table>

Year
Lessons Learned Hep B Moms Program

- Better coordination is needed between OB, HBV provider, delivery hospital, pediatrician and DOH for comprehensive management of HBV+ pregnancies and infants
- Accurate information exchange amongst all providers is crucial (EMR, RHIO, protocols)
- Increasing use of antiviral treatment in pregnancy seen (more use of Tenofovir, which was approved in 2008 & category B)
- Culturally relevant patient education can engage mothers; help ensure recommendation occur (and prevent medical error)

Immunization Action Coalition’s Hepatitis B Birth Dose Honor Roll

Recognizes hospitals and birthing centers that have attained 90% or greater coverage rates for administering hepatitis B vaccine at birth.

[www.immunize.org/honor-roll/birthdose](http://www.immunize.org/honor-roll/birthdose)

13 hospitals in New York City are on the Honor roll.

Only 1 in the entire state of NJ!
Elimination of HBV Infection and HBV-related diseases

HBV susceptible

Vaccine
Universal precautions

Acute HBV

Antiviral treatment

Chronic HBV

Cirrhosis / HCC

HBV Drug Pipeline: Cure in the Next 10 years?!
We have the tools, but it will take a global movement to eliminate viral hepatitis.

#Nohep www.nohep.org

Join Us.

NJ Hepatitis B Coalition
http://www.hepbnj.org/